

CLAIMS

1. Individual cell (5) for a fuel cell (1) comprising a first and a second electrode layers (10) enabling gas transfer and respectively having a first and a second porosities, a solid electrolyte layer (16) located between the two electrode layers (10), the two electrode layers (10) consisting of an anode (12) and a cathode (14), the first electrode layer (10) comprising at least a first compact zone (11) with a third porosity, the third porosity being lower than the first porosity, characterised in that a first compact zone (11) is a protuberance (17) of the electrolyte layer (16) and/or is composed of the densified material (13) from which the electrode (10) including said zone (11) is made.

2. Individual cell for a fuel cell according to claim 1 wherein the first electrode layer (10) has a first thickness and a first compact zone (11) has a thickness identical to the first thickness.

3. Individual cell for a fuel cell according to claim 1 wherein the second electrode layer (10) comprises at least a second compact zone (11) with a fourth porosity, the fourth porosity being lower than the second porosity.

4. Individual cell for a fuel cell according to claim 3 wherein the second electrode layer

(10) has a second thickness, and a second compact zone
(11) has a thickness identical to the second thickness.

5. Individual cell for a fuel cell
according to any of claims 3 or 4 wherein a second
compact zone (11) is a protuberance (17) of the
electrolyte layer (16) and/or is composed of the
densified material (13) from which the electrode (10)
including said zone (11) is made.

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6. Individual cell for a fuel cell
according to any of claims 1 to 5 also comprising at
least one bipolar plate (20) adjacent to an electrode
layer (10).

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7. Individual cell for a fuel cell
according to claim 6 comprising two bipolar plates (20)
adjacent to each electrode layer (12, 14).

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8. Individual cell for a fuel cell
according to any of claims 6 or 7 wherein the bipolar
plate (20) has a coefficient of thermal expansion
higher than the coefficient of thermal expansion of the
adjacent electrode layer (10) and the electrolyte layer
25 (16).

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9. Individual cell for a fuel cell
according to claim 8 wherein at least the bipolar plate
(20) which has the coefficient of thermal expansion
higher than the coefficient of thermal expansion of the
electrode layer (10) and electrolyte layer (16) is

connected to the adjacent electrode layer (10) by nesting (18, 22).

10. Individual cell for a fuel cell
5 according to claim 9 wherein at least said bipolar plate (20) comprises at least a protuberance (22) and the adjacent layer (10, 16) comprises a cavity (18), said protuberance (22) of the bipolar plate and the cavity (18) fitting one into the other.

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11. Individual cell for a fuel cell according to claim 10 wherein the cavity (18) is located in a compact zone (11) of the electrode layer (10).

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12. Individual cell for a fuel cell according to claim 11 wherein the cavity (18) is located in a protuberance (17) of the electrolyte layer (16).

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13. Individual cell for a fuel cell according to any of claims 10 to 12 wherein the cavity (18) is larger in width and/or in depth than the width and/or height of the protuberance (22) of the bipolar plate (20).

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14. Individual cell for a fuel cell according to any of claims 10 to 13 comprising a plurality of cavities (18).

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15. Individual cell for a fuel cell according to any of claims 10 to 14 also comprising at least a first gas inlet (4) on the cathode (14) such that the entire area of the anode (12) adjacent to each 5 first gas inlet (4) is a compact area (11) of the anode (12).

16. Individual cell for a fuel cell according to any of claims 1 to 15 also comprising at 10 least a second gas inlet (3) on the anode (12) such that the entire area of the cathode (14) adjacent to each second gas inlet (3) is a compact area (11) of the cathode (14).

15 17. Fuel cell (1) comprising a stack of cells (5) according to any of claims 15 or 16, each cell (5) being separated from its neighbour by a bipolar plate (20).

20 18. Fuel cell according to claim 17 with a circular plane geometry.